

**Department of Soil and Water Science**

**College of Agriculture**

**University of Salahaddin- Hawler**

**Subject: General Geology**

**Course Book- (Year 2 )**

**Lecturer's name: Dr. Shwan Omar Ismael**

**Avan Mohammad Mustafa**

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | **General Geology** | |
| **2. Lecturer in charge** | **Dr. Shwan Omar Ismael**  **Avan Muhammed Mustafa** | |
| **3. Department/ College** | **Soil & water/ Agriculture** | |
| **4. Contact** | **e-mail: shwan.seeyan@ su.edu.krd**  **e-mail: avan.mustafa@ su.edu.krd** | |
| **5. Time (in hours) per week** | **Theory: 2 hr. & Practical: 3 hr.** | |
| **6. Office hours** | **12 hours** | |
| **7. Course code** |  | |
| **8. Teacher's academic profile** | **Dr. Shwan Omar Ismael**  **PhD in Hydrogeology (2012-2015); TU-Bergakademie Freiberg- Hydrogeology Institute/Germany**  **MSc. In Hydrochemistry and Hydrogeology (2005-2008); Salahaddin University- Science College-Geology Department.**  **BSc. In Geology (1994-1998); Salahaddin University-Science College-Geology Department.**  **Avan Mohammad Mustafa**  **BSc. Geology(2000-2005) College of science, University of Salahaddin- Hawler.**  **MSc. Geology(2008-2011) College of science, University of Salahaddin- Hawler.** | |
| **9. Keywords** | **Erath Science, Rock types, Tectonic and Structural geology** | |
| **10. Course overview:**  Geology is the study of the Earth, the materials of which it is made, the structure of those materials, and the processes acting upon them. The origin of our solar systems and the plate tectonics theory, the minerals and rocks properties, types, sources and occurrence. It includes the study of organisms that have inhabited our planet. An important part of geology is the study of how Earth's materials, structures, processes and organisms have changed over time.  Many processes such as landslides, earthquakes, floods, and volcanic eruptions can be hazardous to people. Geologists work to understand these processes well enough to avoid building important structures where they might be damaged. If geologists can prepare maps of areas that have flooded in the past, they can prepare maps of areas that might be flooded in the future. These maps can be used to guide the development of communities and determine where flood protection or flood insurance is needed. People use Earth materials every day. They use oil that is produced from wells, metals that are produced from mines, and water that has been drawn from streams or from underground. Geologists conduct studies that locate rocks that contain important metals, plan the mines that produce them and the methods used to remove the metals from the rocks. They do similar work to locate and produce oil, natural gas, and groundwater. | | |
| **11. Course objective:**  The course will cover selective topics of general Geology together with print media or internet articles which deals with geology and related subjects. The course include the study of Earth’s materials, changes of the surface and interior of the Earth, and the forces that cause those changes, the origin of solar system and the earth’s layer, Theory of Plate Tectonics and many other subject will studied by the geologist and the processes create the by the geological phenomenon . The aim of this course is to help the student to understand how these geological c processes work, and what they do. How these processes relate to landscape and to human activity and geological environments.  For the practical; A good quality description, interpretation, and evaluation of soil properties in the field can provide useful insights how soil has formed, land use management, natural resource assessment and environmental protection. The practical part of this module will provide students with training and practical experience about site and soil profile description and evaluation in the field using the internationally accepted techniques | | |
| **12. Student's obligation**  Students are strongly encouraged to attend all the Lectures and laboratory exercises, Quizzes, exams and class participation.  Preparing the reports for the laboratory working. Preparing reports for the scientific field trips. Working as a group (group work).  Lab exercises can be completed only during class time. As some labs will require more than a single week, deadlines for each lab report will be announced at the start of each new lab. Quizzes will be given in class, cover the material covered in the lectures  and take 5 minutes each. The final exam will be comprehensive and will cover the lecture  material but will do so in more depth than the quizzes. | | |
| **13. Forms of teaching**  **Lectures:** Different forms of teaching will be used to reach the objectives of the course: power point presentation for the head titles and definitions and summary of conclusions, classification of materials and any other illustration.  There will be classroom discussions and the lecture will give enough background to translate, solve, analyse and evaluate problems sets, and different issues discussed throughout the course.  To get the best of the course, it is suggested that the student attend classes as much as possible, read the required lectures, teachers notes regularly as all of them are foundations for the course. Lectures notes are for supporting and not for submitting the reading material including the hand-outs. Try as much as possible to participate in classroom discussions, preparing the assignments given in the course.  **Practical:** We will be using lab's white board and work sheets in addition to work on source materials and rocks and minerals, to illustrate given exercises throughout the course. | | |
| **14. Assessment scheme**  **Course assessment will be**  There will be quizzes and exams during the semester, given during regular lecture periods. The course grade will be based on the exams and quizzes and weekly reports as shown below:   * Theory Exam 15% * Theory Quiz 5% * Theory Attendance 5% * Laboratory Reports 3% * Practical Quiz 2% * Practical Exam 10% * The total will be 40%   ‌ | | |
| **15. Student learning outcome:**  Students should learn the following:  1. Basic knowledge of crystallography and the main crystal systems.  2. Knowledge of Characteristics, description and macroscopic identification of rock-forming minerals.  3. Simplified classification of rocks.  4. Characterization, description and identification of the igneous rocks.  5. Characterization, description and identification of the sedimentary rocks.  6.Characterization, description and identification of the metamorphic rocks.  7. The student should be able to understand soil and the effect of parent material to the Characteristics of the soil.  8. The student should be able to define the topographic maps.  9. The student should be able to construct topographic cross -section.  10. Get a good idea about the Geological Time Scale.  11. Analysis and interpretation of geological maps, its types and elements.  12. The student should be able to identify and understand the different types of beds: Horizontal, Vertical beds, Strike and dip, Uniformly dipping strata, Unconformities. | | |
| **16. Course Reading List and References‌:**  1.Understanding Earth: Grotzinger, Jordan, Press and Siever, Fifth Edition. W.H. Freeman and Company, New York (2007).  2.Earth: Portrait of a planet: C. Marshak, W. W. Norton & Company, Inc., New York (2001).  3.Fundamentals of Geology: C. W. Montgomery, Third Edition. McGraw-Hill Company, Boston (1997).  4. Earth Sciences: Young, E. and Carruthers, M., Helicon Publishing, Oxford, UK (2001).  And any other physical or general textbook published recently. | | |
| **17. The Topics:** This includes labs on different topics covered in the theory as follows: | | **Lecturer's name** |
| **Week - 1**  **Theory: Introduction to General Geology**  **Lab.:**  **Introduction, course outline and main definitions**  **Week - 2**  **Theory: Crystals and Minerals**  **Lab.:**  **Crystallography and the main Crystal systems**  **Week - 3**  **Theory: Igneous Rocks**  **Lab.:**  **Minerals and their crystal systems in general**  **Week - 4**  **Theory: Sedimentary Rocks**  **Lab.: Minerals- silicate and non- silicate minerals and their properties**  **Week - 5**  **Theory: Metamorphic Rocks**  **Lab.:**  **Igneous Rocks**  **Week - 6**  **Theory: Structural Geology (Fold, Fault, Deformations)**  **Lab.:** **Sedimentary Rocks**  **Week - 7**  **Theory: Weathering , Erosion, and Soils**  **Lab.:** **Metamorphic Rocks**  **Week - 8**  **Theory: Examination**  **Lab.:** **Examination**  **Week - 9**  **Theory: Geological Maps, Topographic maps**  **Lab.:** **Soil and soil profile**  **Week - 10**  **Theory: Structural Geology**  **Lab.:** **Maps/ Topographic map**  **Week - 11**  **Theory: Landscape and Mass movements**  **Lab.:** **Topographic map/ Topographic-cross section**  **Week - 12**  **Theory: Land Slide**  **Lab.:** **Geological Time Scale**  **Week - 13**  **Theory: Engineering Geology**  **Lab.:** **Geological maps/ Horizontal beds**  **Week - 14**  **Theory: Examination**  **Lab.:** **Examination** | | **Dr. Shwan Omar Ismael**  **Avan Mohammad Mustafa** |
| **18. Practical Topics (If there is any)** | |  |
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| **19. Examinations:** The theoretical exams are focused on material studied in lectures and lab material, plus the required reports and quizzes, the formats will be include short answer, definition, multiple choice, and differences. For the practical exam format will be a mixture of short answer, and short essay questions, usually with one to three problems that involve calculations. The quiz will be similar to the exams in terms of the type and difficulty of questions, but shorter.  ***1. Compositional:***  **Theoretical:** includes the comparison between the different materials, the definitions, explanation, discussion, and the selecting materials.  **Practical:** (There will be a crystal system or mineral sample or a rock and the exam is moving from a question to the other, the time required will be 2 minutes or according to the questions, this is used for monthly examination only.)  1.What is this system?  2. What is the relation between crystallographic axes of this system?  3.What is the relation between crystallographic axes and axial angles of this system?  4.Give an example of a system that have like faces.  5. What is the relation between axial angles of this system?  6. What is the hardness of this sample?  7.Type of luster?  8.What is the name of the rock?  9. What is the type of the rock?  10. What is the type of the fracture?  11. What is the color of the sample?  12. What is the transparency of the sample?  13. What is the streak of this sample?  14. What is the cleavage of this sample?  15. What is the grain size of the rock ?  ***2.Questions that need to be calculated:*** | | |
| **20. Extra notes:** | | |
| **21. Peer review ‌** | | |